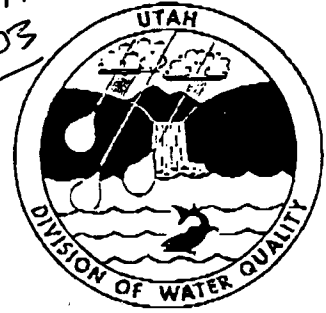




TRANSMITTAL

STATE OF UTAH
 DIVISION OF WATER QUALITY
 DEPARTMENT OF ENVIRONMENTAL QUALITY
 288 NORTH 1460 WEST
 P.O. BOX 144870
 SALT LAKE CITY, UTAH 84114-4870



Telephone: (801) 538-6146

Facsimile: (801) 538-6016

☐ MAIL

DATE: 7-18-96

☐ FAXTO: Tom Munson
DOGM

FROM: Mack Croft ✓

PHONE #: 538-6084

PHONE #: _____

BLM - RADIATION +
 TOWN OF ...
 REAR ...

We are pleased to provide the following to you:

ITEM: B Wellman mine

FAX #: 359-3940

No. of Pages Including Cover Sheet: 6

- ☐ For your action
☐ For your information
☐ Per previous conversation on _____
☐ Per your/our correspondence dated _____
☒ Other _____

MESSAGE: please take a look. our letter says
 now, penta, etc. W. Hedberg says he
 didn't remember this as the case.
 please give me a call, back. Thank
 EXISTING
 MORTIN

BRUSHWELLMAN
ENGINEERED MATERIALSBrush Wellman Inc.
P.O. Box 815
Delta, Utah 84624
Phone 801/864-2701

July 1, 1996

Mr. Lyle Stott
Environmental Engineer
Utah Division of Water Quality
288 North 1460 West
Salt Lake City, Utah 84114



RE: Planned Expansion of Brush Wellman, Inc. Mining Operations at Topaz Mountain, Juab County, Utah

Dear Mr. Stott:

As you are aware, Brush Wellman, Inc. (Brush Wellman) mines beryllium from open pit mines in Juab County, Utah and has been doing so since 1968. The mine is located Sections 5, 7, 8, 9, 10, and 16, Township 13 South, Range 12 West and Section 35, Township 12 South, Range 12 West. Mining to date has opened seven beryllium deposits. A number of the open pits which mined these deposits have been backfilled and reclaimed, others remain open and are active, and still others remain open for future ore recovery. A number of deposits remain undeveloped or partially developed. Brush Wellman's current development plans call for continued development of the mine by opening two new pits in the Blue Chalk and Monitor deposits. These pits will be designated the Blue Chalk North #2 pit (an extension of the existing Blue Chalk North #1 pit) and the Monitor #3 pit (the first segment of a new pit). These pits are located in Sections 9 and 7, Township 13 South, Range 12 West, respectively. Both pits will be mined in the same manner as have previous pits at the mine. Mining and reclamation methods are specified in the State-approved Mine Reclamation Plan and the cost of reclamation of open pits and waste rock dumps is fully bonded through the Division of Oil Gas and Mining.

Brush Wellman believes that under Rule 317-6-6.1A., the open pits and waste rock dumps at its Topaz mining property will not "... result in a discharge of pollutants that may move directly or indirectly into ground water...", and are thus exempt from the ground water discharge permit requirements of the Utah Ground Water Quality Protection Rules. Brush Wellman believes that

Ground Water Notification Letter
Blue Chalk and Monitor Pits

July 1, 1996
Page 2

this position is well justified for the following reasons: precipitation water collected in the pits does not escape to the ground water; current and proposed open pits do not and will not intercept the water table; and the ore and waste rocks are not acid generating. The reasoning is explained in detail in the following paragraphs.

Precipitation Water is Confined to Open Pits

None of the existing open pits at the Brush Wellman mine have encountered the local water table aquifer or a confined aquifer. On occasion a perched water zone is encountered during stripping of the waste rock; however, such occurrences are contained in the open pits and generally dry up quickly. No uniform zone or zones of perched water have been found. Brush Wellman uses such water beneficially for dust control.

Water from precipitation collects in the open pits and is not released from the pits to the ground water. Water is present in open pits during much of each year, although it commonly disappears due to evaporation during the summer months. Brush Wellman's *Topaz Mining Property Reclamation Plan* (JBR Consultants Group, 1988), which has been submitted to and approved by the Utah Division of Oil Gas and Mining, states:

Brush [Wellman]'s mining experience demonstrates that following removal of water standing on the tuff-floored pits, the clay just a few inches below the surface is dry. Therefore, infiltration of runoff water is virtually non-existent.

In addition to being used for dust control water by Brush Wellman, it provides an important source of water to local livestock and wildlife. Livestock prefer the pit water to the local groundwater; therefore, Brush Wellman allows livestock grazers to pump water from the pits for stock watering.

The clayey tuff that forms the barrier to water flow on the pit floors is part of the geologic unit that hosts the beryllium ore deposits. This beryllium tuff member (part of the Topaz Mountain Formation) is ubiquitous in the entire Brush Wellman mine area. The beryllium tuff member was initially deposited as a water-lain tuff which resulted from re-deposition of volcanic ash by surface waters. Ore-forming hydrothermal fluids later deposited the beryllium mineralization and caused hydrothermal alteration of the tuff unit. The predominant hydrothermal alteration mineral is montmorillonite, a clay mineral that swells in the presence of water. (For example, bentonite is a montmorillonitic clay.) The entire beryllium tuff member is hydrothermally

Ground Water Notification Letter
Blue Chalk and Monitor Pits

July 1, 1996
Page 3

altered but not mineralized with bertrandite. Therefore, a large quantity of clayey tuff remains as the floor material of each open pit. This clay-bearing material effectively seals the bottom of each open pit and prevents the escape of accumulated precipitation water from them.

Local Ground Water Elevation and Quality

The nearby local ground water is recovered from a well located in Section 16, Township 13 South, Range 13 West approximately 3.5 miles west of the proposed Monitor pit. The static water level in this well, which is known as the Anaconda well, was measured at an elevation of approximately 4335 feet in 1969. A sample of water taken from the well in 1991 indicated that the water quality is relatively poor with TDS of 2,722 mg/l, chloride at 1,010 mg/l, and sulfate at 332 mg/l.

The United States Geological Survey (USGS) has described the ground water in the valley to the west of the mine site in Technical Publication No. 64 for the Utah Department of Natural Resources. This publication, entitled *Hydrologic Reconnaissance of the Fish Springs Flat Area, Tooele, Juab and Millard Counties, Utah* (1978), provides data on water depth in a well (known locally as the Wildhorse well) located in Section 31, Township 12 South, Range 12 West (approximately 2 miles north of the Monitor pit location). The water elevation in this well when measured by the USGS in 1977 was approximately 4338 AMSL. No water quality data is available for this well. Water quality data (but no static water level) is available for wells from the USGS report for a well in Section 5, Township 12 South, Range 12 West (approximately seven miles north of the Monitor pit). This well, known as the Brush Wellman well, was reported (1977 data) to have TDS of 1,740 mg/l, chloride of 610 mg/l and sulfate of 610 mg/l.

The water quality data from the Anaconda well and the Brush Wellman well suggest that the quality of water in the Brush Wellman mine area would be considered Class II ground water under the Utah Ground Water Quality Protection Rules.

Brush Wellman does extensive development drilling prior to designing and opening each open pit. In general, the local ground water table is not encountered in these drill holes. Drilling in the area of the Blue Chalk deposit in Section 9, including deep drill holes in excess of 900 feet, has not encountered water, other than occasional perched zones which do not persist either with depth or laterally (between closely spaced drill holes).

?
long way
from site

Ground Water Notification Letter
Blue Chalk and Monitor Pits

July 1, 1996
Page 4

During drilling in the vicinity of the proposed new Monitor pit, in Section 7; however, drillers encountered what may be the water table in a few borings. This drilling, which occurred over the period 1991 through 1993, was designed to confirm the thickness, grade (concentration of beryllium), and depth of ore in the deposits. A number of these drill holes were drilled relatively deep on the western side of the deposits where the tuff layer dips to the west and becomes deeper due to faulting. As a result, several of these drill holes encountered water. These borings were evaluated for potential water occurrences by Brush Wellman mine staff and later sounded by JBR and Brush Wellman staff. Water was encountered in four borings on the west side of the proposed pit and one near the east side of the proposed pit. The western borings were drilled well to the west of that part of the ore zone that will be mined. The elevation of the water in these bore holes was quite uniform, ranging from 4339 feet AMSL to 4342 feet AMSL. These water levels are located either in the rhyolite above the tuff or in the tuff itself. Therefore, this water may represent either the local water table, or it may be a local perched water zone resulting from the presence of the underlying impermeable tuff which may act as an aquiclude. An open bore hole near the eastern edge of the open pit encountered water at an elevation of 4317 feet, again in rhyolite on top of the tuff. The water elevations measured in the down dip drill holes at the Monitor pit is almost equal to the water level in the Wildhorse well as measured by USGS (see discussion above).

By contrast, the lowest elevation of the floor of the proposed Monitor pit is planned to be between 4500 and 4365 feet AMSL. Brush Wellman's current pit design, then, calls for mining to advance to within no more than 25 to 160 feet vertically above the elevation of this water occurrence. Therefore, the proposed open pit will not encounter this ground water occurrence. The actual pit depth will be determined after final pit economics, which are now in progress, have been completed.

Potential for Acid Generation

The potential for acid generation in either the open pits or waste rock piles is virtually non-existent. Mineralization at the Brush Wellman mines consists of bertrandite (a silicate mineral), carbonate minerals, and various silicate minerals, and fluorite (calcium fluoride). Minerals composing the tuff and overlying rhyolite are also predominantly silicate minerals. No sulfide minerals have been observed by Brush Wellman geologists or reported in the literature (Daniel R. Shawe, 1968, *Geology of the Spor Mountain Beryllium District, Utah in Ore Deposits of the United States*). Acid mine and acid rock drainage result from oxidation of sulfide minerals. The

Ground Water Notification Letter
Blue Chalk and Monitor Pits

July 1, 1996
Page 5

absence of sulfide mineralization combined with the high pH of precipitation water that collects in the pits demonstrates that acid mine drainage is not a concern for the Brush Wellman mine. The absence of sulfide mineralization combined with the low average annual precipitation at the mine site (six to eight inches per year) makes the future generation of acid rock drainage from the waste rock dumps a virtual impossibility.

The pH of water standing in several of the open pits was measured in 1985 and 1991; the pH ranged from 8.3 to 8.6. These data support the contention that acid generation will not occur. In the absence of acid generation, the integrity of the natural clay seal on the pit bottoms would not be jeopardized and would remain for as long as the pits remain open. In addition, both of these pits will be backfilled as part of ongoing mining and reclamation.

Brush Wellman believes that the foregoing information clearly demonstrates that the open pits will not result in a "...discharge of pollutants that may move directly or indirectly into ground water." Brush Wellman is scheduled to commit to the pre-stripping of these open pits with the contract miner on or about August 1, 1996. Your prompt attention to this matter would be appreciated.

Sincerely,

MHC *Greg Hawkins*

Greg Hawkins
Mine Manager

cc: D. McMillan / Brush Wellman
D. Perry / Brush Wellman
R. Bayer / JBR Environmental
J. Davis / Pruitt Gushee and Bachtell